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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SANTOSH C. LOLAYEKAR, YU-PING CHENG,
ANOOP R. HEGE, SUNIL K. ASTHANA, RENATO E. MARANON,
WAN-HUI LEE, ROBERT T. FREY,
and ENYEW TAN

Appeal 2008-003917
Application 10/051,321
Technology Center 3600

Decided:[1] June 29, 2009

Before MURRIEL E. CRAWFORD, HUBERT C. LORIN, and JOSEPH A. FISCHETTI, *Administrative Patent Judges*.

FISCHETTI, *Administrative Patent Judge*.

DECISION ON APPEAL

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[1]The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134 (2002) of the Examiner's final rejection of claims 1-6, and 8-44. Claim 7 was cancelled. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

SUMMARY OF DECISION

We AFFIRM-IN-PART.

THE INVENTION

Appellants claim a system and method relating to a storage switch which is a scalable switch that allows the creation of a SAN that is easy to deploy and that can be centrally managed. (Specification 6:10-12.)

Claim 1, reproduced below, is representative of the subject matter on appeal.

> 1. A switch for use in a network, comprising:
> a plurality of linecards, each including: a plurality of ports; and a plurality of storage protocol processing units, wherein each storage protocol processing unit is associated with at least one port and performs storage command processing for commands received at said at least one port, thereby distributing processing resources amongst linecard ports, and wherein the switch performs said storage command processing of packets without buffering the packets.

THE REJECTION

The Examiner relies upon the following as evidence of unpatentability:

Latif	US 6,400,730	Jun. 4, 2002
Tzeng	US 6,693,906 B1	Feb. 17, 2004

The following rejection is before us for review.

The Examiner rejected claims 1-6 and 8-44 as obvious under 35 U.S.C. § 103 over Latif in view of Tzeng.

ISSUES

Have Appellants shown that the Examiner erred in rejecting claims 1-6, 8-20, and 24-44 on appeal as being unpatentable under 35 U.S.C. § 103(a) over Latif in view of Tzeng on the grounds that a person with ordinary skill in the art would understand that Latif discloses either alone or in combination with Tzeng a switch which performs a *storage command processing of packets without buffering the packets and/or at wire speed*?

Have Appellants shown that the Examiner erred in rejecting claims 21-23 on appeal as being unpatentable under 35 U.S.C. § 103(a) over Latif in view of Tzeng on the grounds that a person with ordinary skill in the art would understand that Latif discloses either alone or in combination with Tzeng a switch having means associated with each port for performing wire speed storage command processing of packets?

PRINCIPLES OF LAW

A claim limitation will be interpreted to invoke 35 U.S.C. § 112, sixth paragraph, if it meets the following 3-prong analysis:

(A) the claim limitations must use the phrase "means for" or "step for;"
(B) the "means for" or "step for" must be modified by functional language; and

(C) the phrase "means for" or "step for" must not be modified by sufficient structure, material, or acts for achieving the specified function.

Manual of Patent Examining Procedure (MPEP) § 2181 (8th ed., Rev. 7, Jul. 2008).

"The recitation of some structure in a means plus function element does not preclude the applicability of [§ 112, ¶ 6 when it] merely serves to further specify the function of the means. The recited structure tells only what the means-for-joining *does*, not what it *is* structurally." *Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1536 (Fed. Cir. 1991) (emphasis in original) (holding that the claim language "means for joining said pluralities [of link ends] to one another so that the axes of [certain holes are arranged in certain configurations]" invokes § 112, ¶ 6).

Once 35 U.S.C. § 112, sixth paragraph meaning is determined appropriate, we are required by statute to look to appellants' specification and construe the "means" language recited in the claims as limited to the corresponding structure disclosed in the specification and equivalents thereof. *See In re Donaldson Co., Inc.*, 16 F.3d 1189, 1195 (Fed. Cir. 1994).

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary

considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 550 U.S. at 407 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.")

FINDINGS OF FACT

We find the following facts by a preponderance of the evidence:

1. The Specification defines "wire speed" as "...without introducing any more latency that would be introduced by a switch that merely performed switching or routing functions..." (Specification 6:17-19).

2. Latif discloses an embodiment wherein a FC ports on the same switch do not introduce any more latency than would be introduced by a switch that merely performed switching or routing functions in that

> [w]hen an FC port performs a Port Login with an FC port which is local (i.e.[,] connected to the same switch), it is not necessary to change the Buffer to Buffer Receive Data Field Size of the Login request for response. This is because, in one embodiment, the switch supports the maximum frame size or transfers between FC ports (on the same switch). However, the FC port interface logic will always redirect the Port Login packets to the switch's Management Processor to simplify the port interface logic. Thus, in this embodiment, the switch looks and acts like an FC switch from the point of view of any FC devices connected thereto. An example of the routing of Port Login Request and Response frames for local FC ports is shown in FIG. **10**.

(Latif, col. 10, ll. 39-51.)

3. Latif disclose plural device-based modes of performing storage operations such that

> each device, e.g., SCSI device **105**, FC device **110**, Ethernet device **115**, or generic IP device **120** (e.g., disk drive, tape drive, server), performs storage operations based on the SCSI Command Set. For Fibre Channel device **110**, the SCSI commands and data are converted to FCP and transmitted using Fibre Channel interface **111**. For SCSI device **105** the SCSI commands and data are transferred directly using a "parallel" bus **106**. In this embodiment, the SCSI port interface **125** of switch **135** acts like a SCSI to FC bridge so that the SCSI port looks like an FC port from the point of view of switch fabric **140**. As shown, the SCSI data is preferably converted to FCP, and is not actually transmitted using a Fibre Channel interface.

(Latif, col. 6, l. 58 - col. 7-l. 3.)

4. Latif specifically demarks the practice of encapsulating an IP packet as part of data transmission using an Ethernet device in that it specifically discloses "[f]or Ethernet device **115**, SCSI commands and data are converted to FCP and then encapsulated in an IP packet using UDP or TCP. The IP packet is then encapsulated in an Ethernet frame and transmitted using Ethernet interface **116**. (Latif, col. 7, ll. 3-7.)

5. Latif discloses encapsulated FCP data frame in relation only to Ethernet packet size because in this mode, the FCP data is being carried over an Ethernet link. (Latif, col. 9, ll. 50-51.)

6. Latif discloses that "[t]he amount of processing performed by each port interface **270** is dependent on the interface type .... Fibre Channel ports

270$_3$ and **270**$_4$ require the least amount of processing because the internal frame format is most compatible with Fibre Channel. (Latif, col. 7, l. 64–col. 8, l. 5.)

7. Latif however discloses that Ethernet ports 270$_{5,6}$ must convert data into an internal frame format before sending the packets through the switch fabric 240. (Latif, col. 8, ll. 6-9.)

8. The Examiner found that

> Latif et al disclose the processing of storage commands (**column 1, lines 25-30, column 6, lines 9-10, column 19, lines 30-37**,) but fail to explicitly disclose that the switch processes packets without buffering the packets. However, Tzeng discloses a network switch that processes incoming data packets without buffering (**column 1, line 39-column 2, lines 16**). It would have been obvious to one of the ordinary skill in the art at the time of the Applicant's invention to combine the teachings of Latif et al and Tzeng because doing so would reduce the overall cost of the network switch and enhance switching performance.

(Answer 3.)

9. Tzeng discloses

> [e]ach core module is configured for simultaneously generating a corresponding frame tag based on a corresponding equation identifier for a corresponding selected equation and the min term comparison results. Since a given received byte of the incoming data packet is simultaneously compared with the all the relevant min terms, this ensures the real time evaluation of the incoming data packet. Moreover, a plurality of equation core modules minimizes the need for a buffer because

> of the simultaneous generation of multiple frame tags minimizes latency in switching of the incoming data packet.

(Tzeng, col. 2, ll. 31-41.)

10. Appellants invoke 35 U.S.C. § 112, sixth paragraph (Appeal Br. 24) for the interpretation of independent claim 21 and in so doing, Appellants state that the means of claim 21 is Storage Processor Unit (SPU) 701, and specifies by line and page number at Figure 7; page 17, lines 11-1; "[t]he SPU [701] rapidly processes the data traffic allowing for wire-speed operations."

11. The Specification describes that the SPU comprises: a Packet Aggregation and Classification Engine (PACE) 704, a Packet Processing Unit (PPU) 706, an SRAM 705, and a CAM 707. (Specification 17:14-15.) Each PACE has a dedicated path to a PPU 706 while all four PACEs in the illustrated embodiment share a path to the CPU 714, which in one embodiment is a 104MHz/32 (3.2 Gbps) bit data path. (Specification 18:8-11.)

12. The Examiner found regarding claim 9

> Latif et al disclose wherein the switch is capable of receiving a packet at a first port of a first linecard destined for a virtual target and formatted in accordance with a first protocol (**column 2, lines 34-column 3, line 22**), determining if the packet is a data or control packet (**column 7, lines 49-59**), and if the packet is a data packet, sending the packet formatted in accordance with a second protocol to a physical target (**column 2, lines 34-column 3, line 22**).

(Answer 4.)

13. It is our understanding that the practice of periodic backup is a well known practice in the computer art to preserve against losing data.

14. The Examiner found that Latif "...discloses virtualization (**see column 11, lines 5-30, column 16, lines 30-42,column 7, lines 26-46; address translation**)." (Answer 5.)

15. The Examiner found that Latif discloses a processing unit which includes a classification unit *citing to* (column 7, line 45-column 8, line 15, Figs, 8, 16-17). (Answer 5.)

16. The Examiner found that

> Latif et al discloses a Packet Aggregation and Classification Engine and a Packet Processing Unit. Latif et al disclose that the switch performs translation of data packets between SCSi, Fibre Channel and Ethernet devices. (**column 1, lines 18- 25, column 3, lines 5-21, column 6, lines 44-57**). Latif et al further discloses that the switch performs address translation (virtualization) (**see column 11, lines 5-30, column 16, lines 30-42, column 7, lines 26-46**). Tzeng et al discloses a packet classifier (**see column 3, lines 35-45**).

(Answer 11.)

ANALYSIS

We affirm the rejection of claims 1-6, 8-20, and 24-44 on appeal as being unpatentable under 35 U.S.C. § 103(a) over Latif in view of Tzeng and reverse the rejection of claims 21-23 under the same rejection.

*I. Claims 1, 2-6, 8-19, 24-34, and 43-44 and the phrase **without buffering***

Appellants argue that the distinguishing limitation in these claims lies with the phrase "...wherein the switch performs said storage command

processing of packets without buffering the packets (emphasis added)."

(Appeal Br. 16.) In particular, Appellants argue that

> Latif does not disclose processing without buffering packets. Rather, Latif explicitly discloses buffers in the switch for buffering incoming packets for encapsulation in frames for routing and processing within his switch *[see col. 9, lns. 47-57, col. 10, lns. 18-42]*.

(Appeal Br. 16.)

We disagree with Appellants. While Appellants are correct in their assertion that some packets are encapsulated and hence require buffering, this is not the case for all scenarios disclosed in Latif. Rather, Latif discloses plural device-based modes for performing storage operations such that each of a SCSI device 105, FC device 110, Ethernet device 115, or generic IP device 120 (e.g., disk drive, tape drive, server), performs storage operations based on the SCSI Command Set. (FF 3). The portion of Latif which Appellants cite to above, discloses encapsulating FCP data frames in relation only to Ethernet packet size because in this mode, the FCP data is being carried over an Ethernet link. (FF 4, 5.)

In contrast, the other disclosed modes of performing storage operations involve non-encapsulated data frames. One such mode is the SCSI device 105 where the SCSI commands and data are transferred directly using a "parallel" bus 106 (FF 3). Latif also discloses that "[t]he amount of processing performed by each port interface 270 is dependent on the interface type." (FF 6.) Fibre Channel ports 270_3 and 270_4 thus require the least amount of processing because the internal frame format is most compatible with Fibre Channel. (FF 6.) By contrast, Ethernet ports $270_{5,6}$

convert data into an internal frame format before sending the packets through the switch fabric 240. (FF 7.)

Furthermore, Latif discloses another embodiment where FC ports on the same switch do not make it necessary to change the Buffer to Buffer Receive Data Field Size of the Login request or response (FF 2). This is because, in one embodiment, the switch supports the maximum frame size or transfers between FC ports (on the same switch) (FF 2). Latif furthermore discloses that in this case, the switch looks and acts like an FC switch from the point of view of any FC devices connected thereto. (FF 2.) Therefore, we find that these scenarios do not require data encapsulation when transmitting data, a characteristic which Appellants argue is associated with buffering (Appeal Br. 16). We thus find an absence of buffering in these scenarios.

Our analysis could stop here because the claims do not distinguish between the types of modes or devices which transmit the data. *See In re Bush,* 296 F.2d 491, 496 (CCPA 1961). However, in the interest of completeness, we note that the Examiner by focusing only on the Ethernet mode in Latif found that Latif "... fail[s] to explicitly disclose that the switch processes packets without buffering the packets," but that "... Tzeng discloses a network switch that processes incoming data packets without buffering ...." (FF 8.)

We agree with the Examiner's finding in that Tzeng discloses using core modules configured for simultaneously generating a corresponding frame tag based on a corresponding equation identifier for a corresponding selected equation...." (FF 9.) The Examiner concluded "[i]t would have been obvious to one of the ordinary skill in the art at the time of the

Applicant[s'] invention to combine the teachings of Latif et al[.] and Tzeng because doing so would reduce the overall cost of the network switch and enhance switching performance." (FF 8.)

Appellants argue however that "[t]here is no teaching in the references as to how one could accomplish this redesign, and it is not even clear how or whether Latif could be modified and reconstructed to eliminate buffering." (Appeal Br. 18.) We disagree with Appellants. Appellants' argument seeks an explanation of how the plurality of core modules in Tzeng would be bodily incorporated into the system of Latif, which is not the test for obviousness. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Appellants next argue that the Examiner "...has merely offered unsupported assertions that it would be obvious to combine the references." (Appeal Br. 18.)

We disagree with Appellants. The Examiner has provided some articulated reasoning with some rational underpinning for why a person with ordinary skill in the art would modify Latif to include the non-buffering feature of Tzeng. (FF 8.) According to Tzeng, the plurality of equation core modules minimizes the need for a buffer because of the simultaneous generation of multiple frame tags minimizes latency in switching of the incoming data packet. (FF 8.) Thus, in our view, the Examiner's proposal for modifying Latif is reasonable and Appellants' arguments are accordingly not persuasive as to error in the rejection. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. at 418-19.

Claims 9 and 10

Claims 9 and 10 recite in comparable terms,

> *packet at a first port of a first linecard destined for a virtual target and formatted in accordance with a first protocol, determining if the packet is a data or control packet, and if the packet is a data packet, sending the packet formatted in accordance with a second protocol to a physical target, all without buffering the packet.*

(Emphasis added.) Since this is an article claim, we address the structural components of the claim. Structurally, claims 9 and 10 require (1.) *a first port of a first linecard*, (2.) *formatted in accordance with a first protocol,* and (3.) *a physical target to which the data packet is sent.* Apparatus claims are defined by their structure, not their method of use. "[E]xpressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "inclusion of the material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Otto*, 312 F.2d 937, 940 (CCPA 1963). The Examiner found that Latif discloses these structural components (FF 12) and Appellants do not challenge the existence of such devices in Latif. Thus, in light of the breadth of the claims, the Appellants' argument is not persuasive as to error in the rejection.

Claim 14

Claim 14 recites that the storage service is *any one of local mirroring, mirroring over slow link, snapshot, replication, third-party copy, periodic backup, and restore.* Appellants argue that "Latif does not disclose or even suggest these storage operations set out in Claim 14." (Appeal Br. 20.) While it is possible that Latif does not disclose for example, periodic back-up, we will not sustain a rejection made under 35 U.S.C. § 103(a) based on

Appellants' mandating an explicit disclosure of such an old and well known practices, such, as periodic back-up (FF 13). Furthermore, claim 14 is directed to a device and not a method, and thus the method limitations cannot impart patentability to the claims. *See, In re Otto*, 312 F.2d at 940.

Claims 27-29 and 43-44

Claim 27 recites "*wherein the switch is designed to process data packets, including virtualization and translation ....*" (Emphasis added.) The Examiner found that Latif discloses switch virtualization and translation. (FF 14, 15). Appellants' only argument is that the disclosed switch virtualization and translation does not occur without buffering or at "wire speed." Since we have found *supra/infra* that Latif either solely or in combination with Tzeng discloses these features, we are not persuaded as to error in the rejection.

Appellants do not provide a substantive argument as to the separate patentability of remaining claims in this group, but rather merely rely on the restated arguments that these claims recite the non-buffering feature as argued against claim 1 whose rejection is affirmed, these remaining claims thus fall with claim 1. *See,* 37 C.F.R. § 41.37(c)(1)(vii) (2008).

II. Claims 8, 10, 20, 28- 29, and 35- 42 and the phrase ***wire speed***

Exemplary claim 20 recites "each *processing unit includes a classifier, a virtualizer, and a translator that classifies, virtualizes, and translates packets at wire speed.*" (Emphasis added.)

Appellants argue that

> [n]either Latif nor Tzeng teach a plurality of processing units, each of which includes a classifier, a virtualizer and a translator that classifies, virtualizes and translates packets, as

> claimed, and neither reference teaches or suggests performing such operations "at wire speed."

(Appeal Br. 22.)

However, the Examiner found that Latif discloses processing units which include a classifier, a virtualizer and a translator (FF 14-16). Appellants' only reply to these findings is to repeat the claim elements, and thus Appellants' argument is not persuasive as to error in the rejection. A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim. *See*, 37 C.F.R. § 41.37(c)(1)(vii) (2008).

Regarding the second prong of Appellants' argument addressing the wire speed feature of the claims, we find that Latif meets the definition of this term as defined by the Specification (FF 1) in that Latif discloses an embodiment wherein a FC ports on the same switch do not introduce any more latency than would be introduced by a switch that merely performed switching or routing functions (FF 2). Likewise, even modifying the Ethernet device in Latif with the core modules of Tzeng would result in the requirement of no additional latency because the modules are configured for *simultaneously* generating a corresponding frame tag (FF 9).

In light of the breadth of the claim, the Appellants' argument is not persuasive as to error in the rejection.

Claims 35-41

Appellants' only reply to the rejection of these claims is to repeat the claim elements, and restate the reasons asserted against claim 1 which we addressed above. Thus, Appellants' argument is not persuasive as to error in

the rejection. A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim. *See*, 37 C.F.R. § 41.37(c)(1)(vii) (2008).

III. Claims 21-23; 35 U.S.C. § 112, Sixth Paragraph

Claim 21 recites "*means associated with each port for performing wire speed storage command processing of packets.*" (Emphasis added.)

Appellants invoke the language of 35 U.S.C. § 112, sixth paragraph. (FF 10.) We credit this phrase as one under 35 U.S.C. § 112, sixth paragraph.

Accordingly, we are required by statute to look Appellants' Specification and construe the "means" language recited in the last segment of claim 21 as limited to the corresponding structure disclosed in the specification and equivalents thereof. *See In re Donaldson Co., Inc.*, 16 F.3d at 1195.

Appellants assert that the means here is the Storage Processor Unit (SPU) 701 (FF 10). The Specification describes that the SPU comprises: a Packet Aggregation and Classification Engine (PACE) 704, a Packet Processing Unit (PPU) 706, an SRAM 705, and a CAM 707 and each PACE has a dedicated path to a PPU 706 while four PACEs share a data path to the CPU 714. (FF 11.) We thus interpret the means plus function language to include these enumerated elements.

The Examiner asserts that the citations from the Specification which the Appellants use as corresponding structure for the means plus function language of claim 21is unrecognizable. (Answer 10.) We disagree with

Appellants. The cited portion of the Specification on page 17 plainly states that the SPU 701 "rapidly processes the data traffic for wire-speed operations" (FF 10).

The Examiner nevertheless maintains that Latif discloses a Packet Aggregation and Classification Engine and a Packet Processing Unit. (FF 11.) However, a review of the sections in Latif or Tzeng referenced by the Examiner in this finding do not show where Latif or Tzeng either alone or in combination disclose a (1.) Packet Aggregation and Classification Engine (PACE) 704, (2.) a Packet Processing Unit (PPU) 706, (3.) an SRAM 705, (4.) a CAM 707, and (5.) each PACE has a dedicated path to a PPU 706 while four PACEs share a data path to the CPU 714. Accordingly, since we construe claim 21 to import these limitations from the corresponding sections of the Specification and equivalents thereof, and do not find this specific arrangement in the prior art, we will not sustain the rejection of claim 21 or its dependent claims

IV. Claim 42

Appellants only reply to the rejection of claim 42 is to repeat the claim elements, and restate the reasons asserted against claim 20 which we addressed above. Thus, Appellants' argument is not persuasive as to error in the rejection. A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2008)

CONCLUSIONS OF LAW

We conclude the Appellants have not shown that the Examiner erred in rejecting claim 1-6, 8-20, and 24-44 on appeal as being unpatentable under 35 U.S.C. § 103(a) over Latif in view of Tzeng.

We conclude the Appellants have shown that the Examiner erred in rejecting claims 21-23 on appeal as being unpatentable under 35 U.S.C. § 103(a) over Latif in view of Tzeng.

DECISION

The decision of the Examiner to reject claims 1-6, 8-20, and 24-44 is AFFIRMED.

The decision of the Examiner to reject claims 21-23 is REVERSED.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED-IN-PART

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